

REMARKS

In the last Office Action, the Examiner rejected claims 1-10 under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Japanese Publication No. 2000-063963 (JP '963); rejected claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over JP '963; rejected claims 1-10 under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over WO 00/09772 (U.S. Patent No. 6,416,565 was relied upon as an English language equivalent of WO 00/09772); rejected claims 1-10 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of U.S. Patent No. 6,416,565 ("the '565 patent"); and rejected claims 1-10 under 35 U.S.C. § 112, 2nd paragraph.

As a preliminary matter, Applicants wish to note that JP '963, WO 00/09772, and the '565 patent are all related documents. Specifically, the '565 patent was a national stage application of PCT/JP99/04350, which was published as WO 00/09772. Further, JP '963 serves as a priority document to both the '565 patent and PCT/JP99/04350. Each of JP '963, WO 00/09772, and the '565 patent has the same assignee and the same inventive entity as the present application.

Applicants respectfully traverse the rejection of claims 1-10 under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Japanese Publication No. 2000-063963 (JP '963) for at least the reason that JP '963 fails to disclose or suggest every claim element. For example, both independent claim 1 and independent claim 5 recite a combination of method steps including, *inter alia*, producing a slag, in which a weight ratio of CaO to (SiO₂ + CaO) ("CaO ratio") is *greater than* 0.6 to 0.85, and a weight ratio of Fe to (FeO_x + SiO₂ + CaO) ("Fe ratio") is

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greater than 0.5 to 0.6, and wherein the temperature of the slag is maintained up to 1280°C. JP '963 fails to disclose or suggest at least these claim elements with "sufficient specificity" to constitute an anticipation under the statute. M.P.E.P. § 2131.03.

The Examiner has properly recognized that JP '963 does not disclose, e.g., a CaO ratio of greater than 0.6 to 0.85, as claimed in the present application. In an attempt to support the Section 102(a) rejection of claims 1-10, however, the Examiner has asserted that the CaO ratio of JP '963 and the claimed CaO ratio "touch" and, therefore, "there is no patentable difference" between the CaO ratio of JP '963 and the claimed CaO ratio. The Examiner has relied upon the *Titanium Metals* case to support the proposition that a disclosed range that touches a claimed range anticipates the claimed range. Specifically, in *Titanium Metals*, the Court held that "when ... a claim covers several compositions, the claim is 'anticipated' if *one* of them is in the prior art." *Titanium Metals Corp. v. Banner* 778 F.2d 775, 227 U.S.P.Q. 773, 779 (Fed. Cir. 1985).

In the present application, the claimed CaO ratio does *not* touch the CaO ratio disclosed in JP '963, and therefore, the CaO ratio of JP '963 does not anticipate the claimed CaO ratio. In order to "touch" under *Titanium Metals*, a claimed range and a range disclosed in the prior art must share at least one value (i.e., there must be at least one composition in the prior art that is included in the claimed range). Here, none of the values of the prior art is included in the presently pending claims. For example, JP '963 discloses a CaO ratio in a range of 0.3 to 0.6. Claims 1 and 5, however, recite a CaO ratio that is "greater than 0.6" (i.e., not equal to 0.6). Because none of the disclosed CaO ratios fall within the claimed range, the claimed range and the range disclosed in the prior art do not share even one value. Therefore, the claimed range and the range

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disclosed in the prior art do not "touch." Accordingly, JP '963 does not anticipate at least the claimed CaO ratio.

Nevertheless, even if the ranges did touch or overlap, JP '963 fails to disclose or suggest at least these claim elements with "sufficient specificity" to constitute an anticipation under the statute. For example, if the claims are directed to a narrow range, the prior art reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. M.P.E.P. § 2131.03.

The disclosure of the present application clearly identifies several unexpected results produced by the methods recited in the pending claims. For example, at a temperature of 1280°C, a CaO ratio above 0.6, and an Fe ratio above 0.5, the melting area generated by the methods of the present invention is different than for conventionally known ternary compounds. While the conventional phase diagrams predict a melt area at 1280°C only in areas where the amount of FeO or Fe₂O₃ is large, the inventors have found that the actual production conditions generate unexpected results. Specifically, a melt area at temperatures of about 1280°C may be formed even in areas with less FeO_x than conventionally predicted and may depend more on the amount of copper oxide that is molten in the slag. (Spec., p. 13.) Further, the methods of the present invention, including the recited CaO and Fe ratios, result in lower amounts of copper loss to the slag as compared to the methods of JP '963, as described at p. 13 of the specification (note: JP '963 is specifically identified along with benefits that the present invention offers over the methods of JP '963).

Because JP '963 fails to disclose every claim element, either explicitly or with "sufficient specificity," the rejection of claims 1-10 under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over JP '963 is improper and should be withdrawn.

Applicants respectfully traverse the rejection of claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over JP '963. No *prima facie* case of obviousness has been established with respect to claims 1-10 for at least the reason that JP '963 fails to teach or suggest every claim element. For example, JP '963 fails to teach or suggest a combination of method steps including, *inter alia*, producing a slag, in which a weight ratio of CaO to ($\text{SiO}_2 + \text{CaO}$) ("CaO ratio") is *greater* than 0.6 to 0.85, and a weight ratio of Fe to ($\text{FeO}_x + \text{SiO}_2 + \text{CaO}$) ("Fe ratio") is *greater* than 0.5 to 0.6, and wherein the temperature of the slag is maintained up to 1280°C, as included in independent claims 1 and 5.

The Examiner has properly noted that the claimed CaO and Fe ratios do not overlap with the ratios disclosed in JP '963. The Examiner has suggested, however, that the claimed ratios are unpatentable because the claimed ratios and the ratios of JP '963 are close enough that one skilled in the art would have expected that these ratios would have the same properties. Applicants respectfully disagree. For example, Fig. 1A of JP '963 shows a graph of copper amount in the slag as a function of the CaO ratio (horizontal axis) and Fe% (vertical axis). The lines on the graph represent the saturation lines of each solid phase. As shown, the claimed CaO ratio of greater than 0.6 falls outside of these saturation lines. This fact would indicate to one skilled in the art that at CaO ratios of more than 0.6, there would be significant changes in the amount of copper in the slag and in the slag properties. Accordingly, from the

disclosure in JP '963, one skilled in the art would not have expected the claimed CaO and Fe ratios to have the same properties as the ratios of JP '963.

Further, as discussed above, the claimed CaO and Fe ratios generate unexpected results. For example, at a temperature of 1280°C, a CaO ratio above 0.6, and an Fe ratio above 0.5, the melting area is different than for conventionally known ternary compounds. While the conventional phase diagrams predict a melt area at 1280°C only in areas with large amounts of FeO or Fe₂O₃, the inventors have found that the actual production conditions generate unexpected results. Specifically, a melt area at temperatures of about 1280°C may be formed even in areas with less FeO_x than conventionally predicted and may depend more on the amount of copper oxide that is molten in the slag. (Spec., p. 13.) Further, the methods of the present invention, including the recited CaO and Fe ratios, result in lower amounts of copper loss than the methods of JP '963. (Spec. , p. 13.)

For at least these reasons, the Section 103(a) rejection of claims 1-10 as being unpatentable over JP '963 is improper and should be withdrawn.

Applicants respectfully traverse the rejection of claims 1-10 under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over WO 00/09772. As noted above, JP '963 and WO 00/09772 are related documents (i.e., JP '963 served as the priority document for PCT/JP99/04350, which published as WO 00/09772). Based on a review of the figures and the automated English language translation of JP '963 provided by the Japanese Patent Office, the disclosures of JP '963 and WO 00/09772 appear substantially identical. Therefore, the comments above with respect to JP '963 and the rejection of claims 1-10 under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over JP '963

apply here as well. Accordingly, Applicants respectfully submit that the rejection of claims 1-10 under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over WO 00/09772 is improper and should be withdrawn.

Applicants respectfully traverse the rejection of claims 1-10 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of the '565 patent. The Examiner has contended that claims 1-10 of the present application are not "patentably distinct" from claims 1-10 of the '565 patent because the slag composition of the '565 patent does not "patentably differ" from the claimed slag composition. Other than a citation to *Titanium Metals*, the Examiner has not explained or further offered reasoning in support of this contention. In view of the similarities with respect to the rejections based on JP '963 and WO 00/09772, Applicants will assume that the Examiner intended similar reasoning to apply here.

Applicants respectfully submit that the claims of the present application are patentably distinct from claims 1-10 of the '565 patent. As noted above, the '565 patent application was filed as a national stage of PCT/JP99/04350, which was published as WO 00/09772. Further, the '565 patent cites JP '963 (i.e., the publication of application no. 10-229803) as a foreign priority document. Therefore, the comments above with respect to WO 00/09772 and JP '963 also apply to the '565 patent. Specifically, the claims of the present application patentably differ from claims 1-10 of the '565 patent for at least the reasons that (1) the claimed CaO ratio does *not* touch the CaO ratio as claimed in the '565 patent; (2) the methods recited in the pending claims produce several unexpected results over the methods claimed in the '565 patent (e.g., a melting area different than for conventionally known ternary compounds, and lower amounts of copper loss); and (3) based on the disclosure of the '565 patent, one skilled in the art

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would not have expected the CaO and Fe ratios in the claims of the present application to have the same properties as the ratios claimed in the '565 patent.

For at least these reasons, the rejection of claims 1-10 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of the '565 patent is improper and should be withdrawn.

Applicants respectfully traverse the rejection of claims 1-10 under 35 U.S.C. § 112, 2nd paragraph. While Applicants believe that the previous versions of claims 1 and 5 had sufficient antecedent basis for the "Fe" element, Applicants have proposed to amend claims 1 and 5, as shown above, to clarify the claim language. Additionally, Applicant's respectfully disagree with the Examiner's contention that "[c]laims 1 and 5 are indefinite because the exact sequence of steps [is] not clearly recited." Section 112, 2nd paragraph does not require that a process claim be written in an "exact sequence of steps," as the Examiner has implied. Nevertheless, in an attempt to further clarify the claim language in view of the Examiner's remarks, claim 1 has been amended to more clearly indicate that the addition of SiO₂ and CaO may be performed as part of the oxygen-smelting step. Applicants respectfully submit that claims 1-10 fully comply with the provisions of Section 112, 2nd paragraph, and therefore, the Section 112, 2nd paragraph rejection of claims 1-10 should be withdrawn.

Applicants respectfully request that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner. The proposed amendments of claims 1 and 5 do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner, since all of the elements and their relationships claimed were either earlier claimed or inherent in the claims as examined. Therefore, this Amendment should allow for immediate action by the Examiner.

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Furthermore, Applicants respectfully point out that the final action by the Examiner presented some new arguments as to the application of the art against Applicant's invention. It is respectfully submitted that the entering of the Amendment would allow the Applicants to reply to the final rejections and place the application in condition for allowance.

Finally, Applicants submit that the entry of the amendment would place the application in better form for appeal, should the Examiner dispute the patentability of the pending claims.

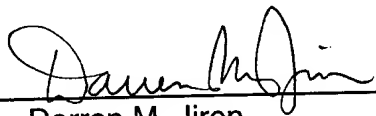
In view of the foregoing, Applicant respectfully requests the reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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